If the views of Englander prove to be correct (which is doubtful) the citrating of milk warmly advocated by Poynton, Shaw and Cotton, (which I used for a number of years following Poynton's original recommendation and abandoned) is in effect but the addition of sodium chlorides to the digesting food. Englander thinks that the citrate of soda reacts with the hydrochloric acid in the stomach and so produces sodium chloride. Chapin believes that the citrate prevents clotting by the renin in the stomach and throws the work of digestion entirely on the intestine. This is probably the true view as we know that the citrates reduce the ionization of calcium and therefore its chemical activity, and it is a proven fact that the activity of calcium is essential to renin action.

To sum up then, successful infant feeding depends on: 1—Clean milk. 2—A simple modification plan which we have ready to hand in Chapin's top milk scheme. 3—A control of digestion through an understanding and application of the percentage proportion plan. 4—A thorough grasp of the infant's nutritive needs measured in calories. 5—An application of the laws of hygiene to the infant's environment.

A Simple Method of Computing, Approximately, Percentages of Proteid, Fat or Carbohydrate in Milk Mixtures, Based on Analysis of San Francisco Milk.

	Whole Milk.	Top 9 oz. dipped from 1 quart after 4 hours' standing.	Top 15 oz. Same Conditions.	Top 20 oz. Same Conditions.
Proteid	3.5%	3.5%	3.5%	3.5%
Fat	3.4%	10%	7 %	5 %

Fat values of all milks should be known before beginning their use.

To find % of proteid in any dilution divide % of proteid in whole milk by the denominator of the fraction representing the proportion of milk in mixture—i. e., in a mixture ⅛ milk divide $\frac{3.5}{8} = .44\%$ proteid.

A dilution of 1 to 6 = 1-7 milk; proteid $\% = \frac{3.5}{7} = 5\%$ proteid in mixture.

A dilution of 1 to 5 = 1-6 milk; proteid $\% = \frac{3.5}{6} = 6\%$ proteid in mixture.

A dilution of 1 to 4 = 1-5 milk; proteid $\% = \frac{3.5}{5} = 7\%$ proteid in mixture. And so on.

To find % of fat in any dilution of milk, divide % of fat in milk used by denominator of fraction representing proportion of milk in mixture. With 9 oz. top milk containing 10% fat.

1-7 milk $= \frac{10}{7} = 1.4\%$; 1-5 milk $= \frac{10}{5} = 2\%$; 1-3 milk $= \frac{10}{3} = 3.3\%$

3 to 3½% is the maximum concentration of fat desirable. When this is reached with 9 oz. milk change to 15 oz. top milk.

15 oz. milk = 7% fat; 1-3 milk $= \frac{7}{3} = 2.3$.

20 oz. milk — 2-3 milk = 5% x $\frac{2}{3} = \frac{10}{3} = 3.3\%$ fat.

Sugar per cents in dilution are practically the same as proteid.

1 oz. of sugar to 20 oz. of mixture = 5% sugar; with a dilution of 1 to 5 sugar = .7, add 5% or any other % required.

To Compute Food Values of Percentage Mixtures.

(1) A calorie is the amount of heat necessary to raise 1 kilogram (2 1-5 pounds) of water through 1° centigrade.

(2) A child during the first three months needs 40 calories per pound per day; in the second three months, 36 to 38 calories; and in the second half year, 30 to 35 calories.

(3) During the first three months a child will lose weight if supplied with less than 30 calories per pound per day.

(4) 1 gram of animal proteid = 4.1 calories.
1 gram of carbohydrate = 4.1 calories.
1 gram of fat = 9.3 calories.

(5) 1000 grams = 1 litre = a 1% solution = 10 grams to litre.

(6) 29.51 grams = 1 oz. ∴ 1 litre = in oz. $\frac{1000}{29.51}$ say = 33.93 oz. = 34 oz. to litre.

Assume a modified milk, containing proteid 1¼%, carbohydrate 5%, fat 3%—one litre of such a mixture would contain:

Carbohydrate	5 x 10 = 50	grams.
Proteid	1¼ x 10 = 12½	grams.
Fat	3 x 10 = 30	grams.

50 grams of C. H. = in calories 50 x 4.1 = 205 calories.

12½ grams of proteid = in calories 12½ x 4.1 = 50 calories.

30 grams of fat = in calories 30 x 9.3 = 279 calories.

Food value of 1 litre of the mixture.....534 calories.

To find what daily amount of the above mixture will supply the nutritive needs of a normal 15-pound baby five to six months old:

Calories needs per pound per day = 38.
x baby's weight in pounds = 15 = 15 x 38 = 570.
570 calories needed per day.

1 litre of the mixture gives 534 calories, or 36 calories short of enough for a 15-lb child.

If 34 oz. = 1 litre, and 1 litre = 534 calories, the calories in 1 oz. will $= \frac{534}{34} = 15.7$ calories to each oz.

Then calories needed by child 570 divided by calories in 1 oz. of the mixture $15.7 = \frac{570}{15.7} = 36$ 1-3 oz.—amount of this mixture required daily by child.

Practically 570 = 36 — or 6 daily bottles of 6 oz. each.

Discussion.

Dr. Blum, San Francisco: We find in practice that the individual is not in all cases ready and prepared to handle the quantity of food that it should handle were it a normal child, and these are really the children which the pediatrists get to feed. This throws us back to the original guide which we have, the individual patient and examination, as referred to by Dr. Porter, of the stools, from which we must draw our conclusions irrespective of any theory. The second point to be touched upon is the hardest for all of us, and that is the uncleanliness of the milk. It is a fact that the milk contains not only bacteria of various kinds, but gross particles of dirt. Any one using a centrifuge will find plenty of dirt. The germs which are found vary in San Francisco, and each year in the months of August and September it has been my lot to find certain cases of streptococcus. I found ten cases in the month of September. The practical point which we have to meet is how to overcome that, and it throws us back to either one of two methods: First, boiling the milk, and, second, the addition of antiseptics. Another point of importance is the time of examining cow's milk for the bacterial content. We speak of the milk containing 1,000,000 bacteria or 10,000 bacteria, and we receive literature on this subject speaking of the tests and of the excellence of certain dairies, but they usually do not state how long after the milk was drawn these tests were made nor at what temperature. This is of the most extreme importance, for we know that milk examined perhaps one hour after being drawn contains a few thousand bacteria, and if kept at a temperature of 75° for thirty-six hours it will contain something between 10,000,000 and 12,000,000 bacteria.

Dr. A. B. Spalding, San Francisco: In discussing this paper I think there are two points to be taken into consideration in regard to the feeding of infants, and those are whether you are feeding a sick or a well baby, and whether the family is taking clean milk or contaminated milk. I have had quite a little experience with the Milk Commission in San Francisco, and I will say with regard to the Oakland Milk Commission that they have succeeded in carrying out their rules and plans and have had very good milk for quite a length of time, and also the Los Angeles people. In treating infants it makes a great difference whether you are dealing with poor milk or good milk. I have seen several cases do poorly on milk in San Francisco, and on sending them to the country the good results are almost immediate. If we start with a well baby it is easy to keep it well with common sense and little formulae. The idea of reading formulae over is apt to be very confusing. If we are dealing with well babies a simple formula is all that we require, and if we are dealing with sick babies very little feeding is necessary at all.

Dr. E. N. Ewer, Oakland: The physicians of Oakland had plenty of experience in feeding babies good milk. They have had sanitary diaries which produce good milk. Two years ago a committee was appointed in the Alameda Medical Association and Home Club of Oakland and Health Department to draw up clean milk ordinances. It limits the bacteria content to 100,000 colonies in summer and 75,000 in winter. The result is interesting. There are not over 20% in our samples of milk where the bacterial content is over 100,000. With regard to the newspapers and the Board of Health, about a year ago two inspectors came over and investigated that dairy and published very adverse reports concerning it, and the principal criticism was the fact that the troughs from which the cows drank contained dirty water.

Dr. Geo. H. Hare, Fresno: I am pleased with the progress toward clean mik. The point is that this whole question with regard to purity of food lies more largely with the attitude of our profession than any other factor. I believe that were the medical profession to occupy the place it ought to we would not hear such disgraceful reports. Two years ago the little town of Fresno appointed a Commission which took hold of the milk question and brought it to a working point, and any dairy with a bacterial content above 50,000 had its license removed. This worked and worked successfully. Dr. Porter gave a preference to cane sugar over any other form of sugar. I could not endorse this and would like him to explain his statement and why it is better.

Dr. Charlotte Baker, San Diego: I think it is important to give the mothers better directions as to the feeding of the infant. We often give her directions as to how the child should be fed at three months and six months, etc., but I think it is better to tell her to weigh the baby and feed it in proportion to its weight.

Dr. Thomas McCleave, Berkeley: I think that if a great deal of bad work has been done in the feeding of babies the profession is largely responsible. I think we are responsible for the wide spread of patent foods. Then we leave a baby to the mother as to how it should be fed. We often see the most atrocious things being done on the advice of the physician, or neglect of the physician. Formulas scare the mothers off. They should be put down in the form of prescriptions and given to the mother. Dr. Porter discusses only the artificial feeding of babies. I think every effort should be made to make a mother nurse a child. I take every effort to correct the mother's milk, and I am surprised how much can be done in apparently hopeless cases to bring her to the point where she can nurse that baby. There is too much carelessness in permitting women to cease nursing their babies. It is necessary to study children also as to the composition of the food. Dr. Porter spoke of the influence of fat on proteid digestion. It is a point to be emphasized. Most of the profession are ignorant of it. If a proper study is made you will find the fat not being digested, and the reason the proteid is not being digested is because it is covered with undigested fat. As to the question of sodium citrate vs. sodium chloride, I have made a careful study in addition to the milk formulas and am much interested. My experience has been that of Dr. Porter that there is no advantage in the use of sodium citrate over the sodium chloride. Sodium chloride is just as effective.

Dr. Porter, San Francisco: I am glad to find so much interest in this subject. With regard to the question of boiling milk, in San Francisco, I agree that we have to boil it sometimes several times. As to the growth of bacteria, very much more importance is to be laid on the kind of medium we use to grow the germs. With gelatin we are able to determine the full content. With agar we are not. With regard to the price of milk, we have to pay just as much for dirty milk as we do for clean milk. With regard to sick and well babies, you do not feed a sick baby; it is put on half rations, and perhaps no rations at all. I tried to emphasize the point of feeding babies according to weight and subcutaneous fat, but we cannot make the age rule or the weight rule. We have to look at the baby and then feed it. With regard to the dairy in Oakland, it is, I believe, the best illustration of what can be done. At San Jose Mr. Rhea put in lots of money and the ordinary equipment and managed to keep the bacterial count down to 16,000. I remarked that cane sugar is better because it is more convenient. We have no data to prove that lactose of cow's milk is the same as human milk, and no information to show that milk sugar is better digested than cane sugar. It is discouraging to find how often men use proprie-

tary foods. With regard to giving a table for the needs of the baby, that is all bosh. A baby uses per pound according to thinness and fatness of the child. No one can make a table. All I tried to do is to call your attention to the fact that we have a definite measure for foods and for babies' needs and can approximate with better success by using these measures.

SURGICAL TREATMENT OF GASTROPTOSIS.

By J. HENRY BARBAT, M. D., San Francisco.

The first recorded operative procedure for the cure of gastroptosis was by Duret of Lille in 1894. The operation consisted in sewing the stomach to the anterior abdominal wall, and was done for an extreme case of gastroptosis. The result was excellent, but has not found favor with the majority of surgeons, on account of the fixation of a normally movable organ, a condition which in itself has sometimes necessitated operative measures for its relief. Similar operations, with slight modifications, were reported by Davis in 1897, and by Rovesing and Hartmann in 1899. Up to date, Rovesing has reported seventy-five cases, and claims good results in practically all of them, but I should still hesitate to sew the stomach to the abdominal wall when some other operation would restore it to its normal position without this abnormal fixation.

Beyea, on April 19, 1898, operated upon a patient with an extreme gastroptosis as follows: The abdomen having been opened in the median line, the gastro-hepatic and gastro-phrenic ligaments were exposed and three rows of interrupted silk sutures were placed from above downward, and from right to left through the gastro-hepatic and gastro-phrenic ligaments, shortening these ligaments and restoring the stomach to its normal position. In a personal letter, Dr. Beyea reports ten patients operated upon by himself in this manner, with excellent results in all cases.

Coffey has reported two cases in which he attached the great omentum to the abdominal wall, forming a sling or hammock for the stomach. This operation has the same objection as the one of Duret or Rovesing, and would undoubtedly leave a large percentage of patients having gastroptosis with pains and discomfort greater than that due to the original disease.

Gastroenterostomy, gastroduodenostomy, gastroplication, and combinations of these operations have been done many times for gastroptosis, with varying results.

Which is the best operation for gastroptosis? The operation best suited for any particular case depends entirely on the pathology present, and the surgeon must make an accurate diagnosis if he expects to cure the patient by an operation.

In simple cases of gastroptosis, in which the lower border of the stomach does not descend below the level of the umbilicus, and where there is no kinking of the pylorus or duodenum, operation is rarely indicated. The cases which *do* almost invariably require operation to cure the patient, are those in which the pylorus or duodenum is kinked or obstructed. If there is actual obstruction or stenosis at the pyloric outlet of the stomach, a gastroenterostomy or gastroduodenostomy must be done, or no relief will be obtained; on the contrary, if no real obstruction exists, and the pylorus is patulous, either of these operations is contraindicated, and will tend to increase rather than decrease the sufferings of the patient.

Gastropexy is the operation of choice in every case in which there is kinking of the pylorus or duodenum, and the method of Beyea or some slight modification of it, will undoubtedly give the largest number of satisfactory results. When there is extreme dilation of the stomach, it may be necessary, in addition to other operations, to do a gastroplication, but I believe that in the large majority of cases, if the proper operation is chosen, no tucking of the stomach will be necessary, because the subsequent treatment will usually restore the muscular tone and cause the stomach to contract to its normal size.

Improvement after operative procedures depends on whether the cause of the symptoms has been removed; and the success or failure of many of the operations which have been done to relieve the miseries of gastroptosis unquestionably hinged on the operator having, by accident or design, relieved the pyloric or duodenal kink or obstruction, which is undoubtedly the primary cause of the symptoms in gastroptosis.

Up to recently, I have been doing either gastroenterostomy or gastroduodenostomy for my cases of gastroptosis, but the results have not been uniformly good, and some of the patients still have some of their old symptoms. This I believe to be due to the fact that the wrong operation was chosen, and an extra opening made in a stomach in which the natural opening was sufficient. Had the angulation of the duodenum been relieved by placing the stomach in its normal position, and retaining it there, the food would be able to pass out at the proper time, the circulation of blood, and therefore the gastric secretions, improved, and gastromotor sufficiency established.

I now determine first whether the pylorus is patulous by pushing the finger, with a fold of the stomach over it, through the pyloric orifice. If it admits the tip of the index finger, there is no necessity of adding another opening, and the operation of choice is gastropexy. Usually Beyea's operation is chosen, but in a recent case the gastrohepatic omentum was so thin and porous, that I modified the operation slightly.

Following is a brief history of the case:

Mrs. W., aged 25 years (kindly referred to me by Dr. A. R. Fritchi for operation), had been suffering for the past three years with accumulation of gas in the stomach to such an extent that her life had become unbearable. She had had her appendix and one ovary removed without any perceptible relief; her stomach had been washed out and everything known to medical science had been tried, without any improvement in her condition. Dr. Fritchi had made several analyses of the stomach contents and